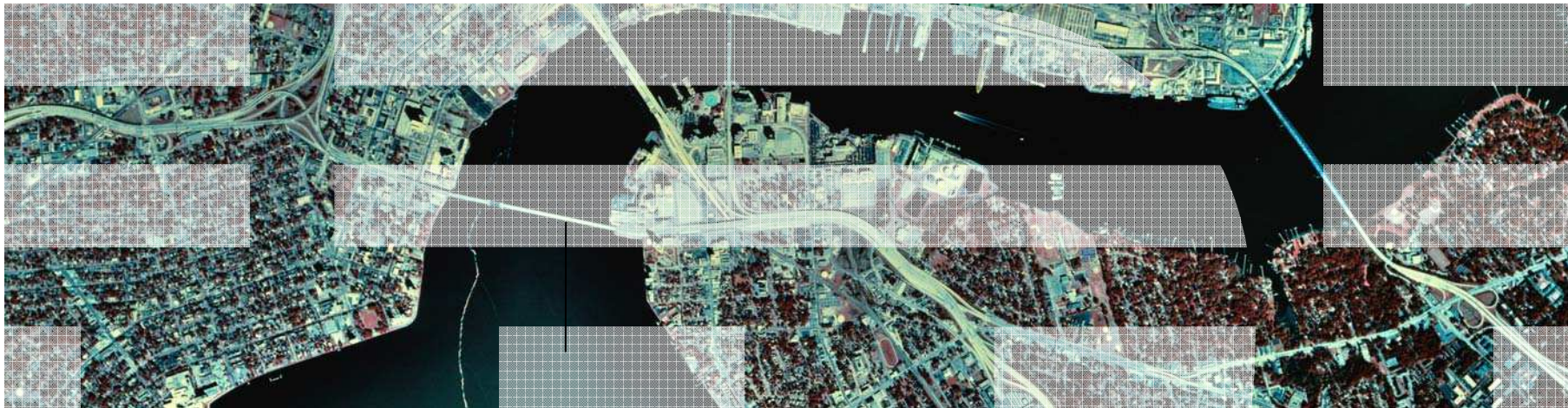


Planning and Migrating to z/VM Single System Image (SSI)

Emily Kate Hugenbruch
ekhugen@us.ibm.com

John Franciscovich
francisj@us.ibm.com





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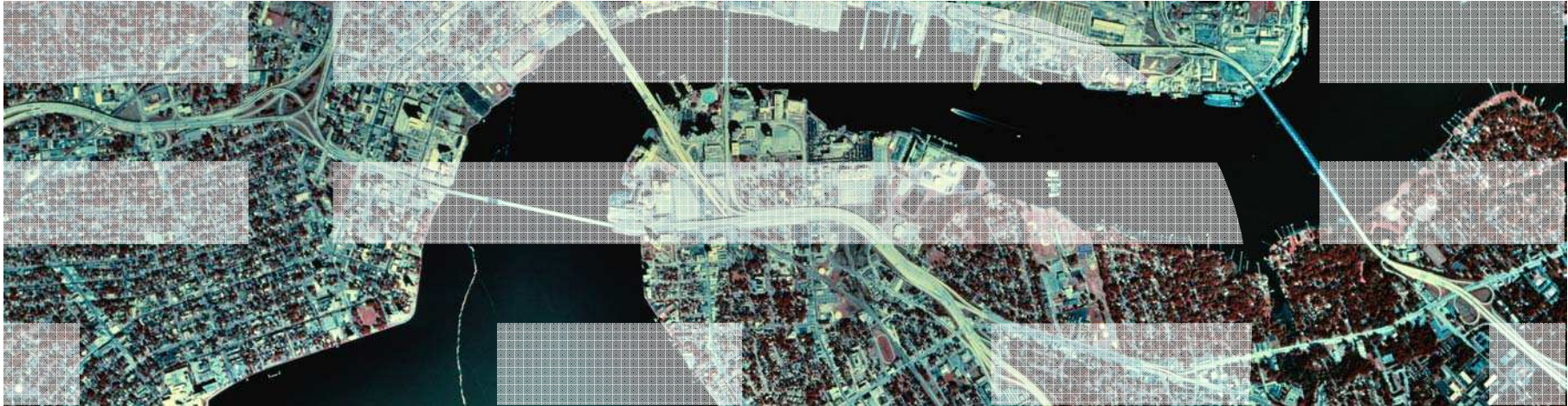
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Topics

- z/VM 6.2 Installation Planning
- Planning and Configuring your SSI Cluster
- Migrating to SSI



z/VM 6.2 Installation Planning

New MAINT Userids

MAINT	PMAINT	MAINT620
Multi Configuration Virtual Machine	Single Configuration Virtual Machine	Single Configuration Virtual Machine
Owns CF1, CF3 parm disks, 190, 193, 19D, 19E, 401, 402, 990 CMS disks	Owns CF0 parm disk, 2CC, 550, 551 disks	Owns the service disks (e.g., 490, 493, 49D) and the CF2 parm disk
Use for work on a particular member, such as attaching devices, or relocating guests	Use for updating the system config, or for SSI-wide work, e.g., defining relocation domains	Use for applying 6.2.0 service. The CF2 parm disk contains 6.2.0 CPLOAD modules.

Minidisks for New MAINT Userids

Parm Disks (*Owner*)

- CF0 (*PMAINT*)
 - Common system configuration file
- CF1 (*MAINT*)
 - Production CPLOAD MODULE
- CF2 (*MAINT620*)
 - Used by SERVICE to hold test CPLOAD MODULE
- CF3 (*MAINT*)
 - Backup of CF1

Full Pack Minidisks

- *MAINT*
 - 122 M01S01
 - 123 M01RES
 - 124 M01W01
- *MAINT620*
 - 131 620RL1
 - 132 620RL2
 - 133 620RL3
- *PMAINT*
 - 141 VMCOM1
 - 142 VMCOM2

Minidisks for New MAINT Userids (by volume)

Cluster-Wide Volume (VMCOM1)

– PMAINT

- CF0 - Common system configuration file
- 2CC - Single source directory
- 41D - VMSES/E production inventory disk
- 551 - SSI cluster common disk - contains utilities that must be at the highest level for all members of the SSI cluster, including
CPFMTXA, DIRECTXA, DIRMAP, DISKMAP

Release Volumes

– MAINT620

- 490 - Test CMS system disk
- 493 - Test system tools disk
- 51D - VMSES/E software inventory disk
- CF2 – Test parm disk

Which Type of Installation Should I Choose?

- SSI Installation
 - Single installation for multiple z/VM images
 - Can also install a single system configured as an SSI member
 - Installed and configured as an SSI cluster
 - Single source directory
 - Shared system configuration file
 - Creates Persistent Data Record (PDR) on Common volume

- Non-SSI installation
 - Single z/VM image
 - Can be converted to initial member of an SSI cluster later
 - Builds DASD layout, directory, and configuration file the same as SSI installation

- Both types of installation are different from previous releases of z/VM
 - Userids
 - Disks
 - Directory
 - System configuration file

- Review documented migration scenarios before deciding whether to do SSI or non-SSI install
 - CP Planning and Administration
 - SSI installation primarily for new or "from scratch" installs

INSTPLAN - Select Installation Type

```
*** z/VM INSTALLATION PLANNING ***

Mark the product(s) selected to be installed into the filepool with an "F"
and those selected to be installed to minidisks with an "M"
  M      VM          M      OSA          M      PERFTK
  M      VMHCD       M      RACF         M      DIRM
  M      RSCS        M      ICKDSF       M      TCPIP

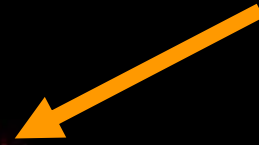
Select a System Default Language.
  X AMENG      _ UCENG      _ KANJI

Select a System DASD model. FBA size can be changed.
  X 3390 Mod 3  _ 3390 Mod 9  _ FBA DASD 6.0

Enter the name of common service filepool.
Filepool Name:  VMPOOL

Select a System Type: Non-SSI or SSI (SSI requires the SSI feature)
  _ Non-SSI Install:  System Name _____
  X SSI Install:      Number of Members 4    SSI Cluster Name SAMPLE

F1 = HELP      F3/F12 = QUIT      F5 = Process  ENTER = Refresh
```



INSTPLAN - SSI Installation

Select first or second level and identify SSI member systems

```
*** z/VM INSTALLATION PLANNING PANEL 3 ***

SSI Cluster Name:  SAMPLE

After installation is complete, the SSI cluster will be IPLed:
X  First-Level
-  Second-Level

SSI Member Name(s):

SLOT #      MEMBER NAME      IPL LPAR/USERID
=====
  1         MEMBER1         LPAR1
  2         MEMBER2         LPAR2
  3         MEMBER3         LPAR3
  4         MEMBER4         LPAR4

F1 = HELP  F3/F12 = QUIT  F5 = Process  ENTER = Refresh
```

INSTPLAN - SSI Installation (cont.)

Define CP-Owned and Release volumes for all members

```

*** z/VM INSTALLATION VOLUME DEFINITION ***

      TYPE      LABEL      ADDRESS      FORMAT (Y/N)
      =====  =====  =====
COMMON  VMCOM1      2000
COMMON2 VMCOM2      2001
RELVOL  620RL1      2002
RELVOL2 620RL2      2003
                                     Y

      TYPE      LABEL      ADDRESS      TYPE      LABEL      ADDRESS
      =====  =====  =====  =====  =====  =====
MEMBER1
RES      M01RES      3000
SPOOL   M01S01      3001
PAGE    M01P01      3002
WORK    M01W01      3003
MEMBER2
RES      M02RES      4000
SPOOL   M02S01      4001
PAGE    M02P01      4002
WORK    M02W01      4003
MEMBER3
RES      M03RES      5000
SPOOL   M03S01      5001
PAGE    M03P01      5002
WORK    M03W01      5003
MEMBER4
RES      M04RES      6000
SPOOL   M04S01      6001
PAGE    M04P01      6002
WORK    M04W01      6003

F1 = HELP      F3/F12 = QUIT      F5 = Process      ENTER = Refresh
    
```

INSTPLAN - SSI Installation (cont.)

Define Common Volume and CTC Device addresses

```

*** z/VM INSTALLATION FIRST-LEVEL CONFIGURATION ***

Real addresses for the common volume on each member LPAR:

VOLUME   DASD      MEMBER1   MEMBER2   MEMBER3   MEMBER4
TYPE     LABEL      ADDRESS   ADDRESS   ADDRESS   ADDRESS
=====  =====  =====  =====  =====  =====
COMMON   VMCOM1      2000      2000      2000      2000

CTC device addresses:

From: MEMBER1
To: MEMBER1      N/A
To: MEMBER2      0100 0101
To: MEMBER3      0300 0301
To: MEMBER4      0400 0401

From: MEMBER2
To: MEMBER1      0100 0101
To: MEMBER2      N/A
To: MEMBER3      0310 0311
To: MEMBER4      0410 0411

From: MEMBER3
To: MEMBER1      0300 0301
To: MEMBER2      0310 0311
To: MEMBER3      N/A
To: MEMBER4      0320 0321

From: MEMBER4
To: MEMBER1      0400 0401
To: MEMBER2      0410 0411
To: MEMBER3      0320 0321
To: MEMBER4      N/A

F1 = HELP      F3/F12 = QUIT      F5 = Process      ENTER = Refresh
    
```

INSTPLAN - Non-SSI Installation

Identify CP-Owned and Release volumes

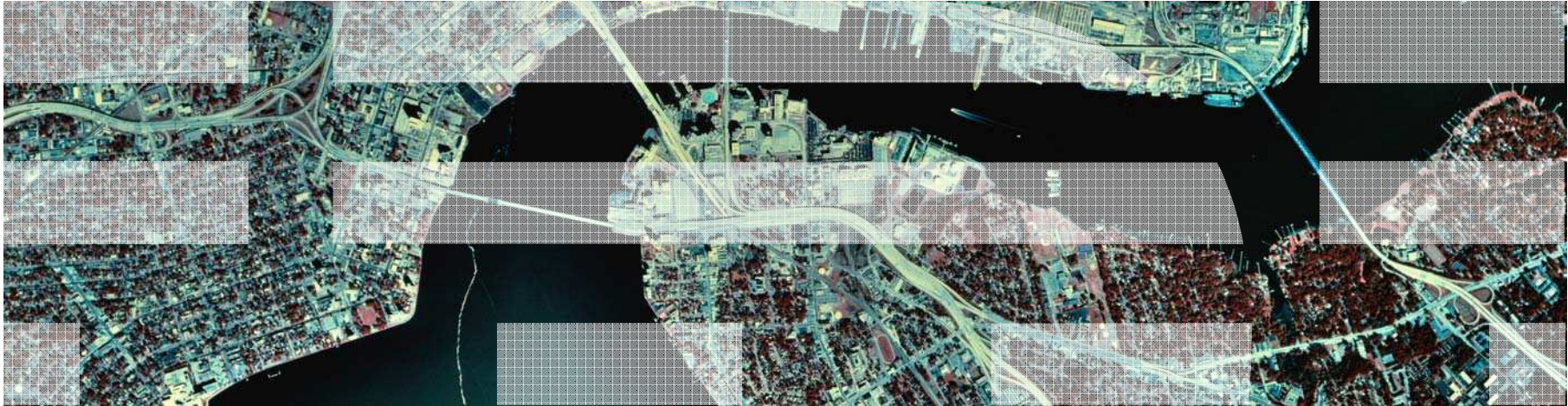
```

*** z/VM INSTALLATION VOLUME DEFINITION ***

TYPE          LABEL          ADDRESS          FORMAT (Y/N)
=====
COMMON        VMCOM1          2000             Y
COMMON2       VMCOM2          2001
RELVOL        620RL1          2002
RELVOL2       620RL2          2003

TYPE          LABEL          ADDRESS
=====
EXAMPLE
RES           M01RES          3000
SPOOL        M01S01          3001
PAGE         M01P01          3002
WORK         M01W01          3003

F1 = HELP      F3/F12 = QUIT    F5 = Process    ENTER = Refresh
    
```



Planning and Configuring your SSI Cluster

SSI Cluster Requirements

- Servers must be IBM System z10 or later (z/VM Version 6)
- Shared and non-shared DASD
 - 3390 volume required for the PDR
 - All volumes should be cabled to all members
 - Makes non-shared disks accessible to other members to fix configuration problems
- LPARs
 - 1-16 FICON CTC devices between LPARs
 - Provide direct ISFC links from each member to all other members
 - FICON channels to shared DASD
 - OSA access to the same LAN segments
 - FCP access to same storage area networks (SANs) with same storage access rights
- Shared system configuration file for all members
- Shared source directory containing user definitions for all members
- Capacity planning for each member of the SSI cluster
 - Ensure sufficient resources are available to contain shifting workload
 - Guests that will relocate
 - Guests that logon to different members

SSI Cluster Topography

1. How many members in your cluster?

2. Production configuration
 - How many CECs?
 - How many LPARS/CEC?
 - *Suggested configuration for 4-member cluster is 2 LPARs on each of 2 CECs*

3. Test configuration
 - VM guests?
 - LPARs?
 - Mixed?

4. Virtual server (guest) distribution
 - Each guest's "home" member?
 - Where can each guest be relocated?
 - *Distribute workload so each member has capacity to receive relocated guests*
 - CPU
 - Memory

SSI Planning Worksheet

Table 4. Linux virtual server requirements for memory, processors, and devices

Linux server user ID	Memory	Virtual processors	DASD	Networking devices	Cryptographic requirements	Member 1	Member 2	Member 3	Member 4
Maximum number of resident and relocated virtual servers:									
Maximum memory for normally resident and relocated virtual servers:									
Memory for z/VM:									
Total virtual memory requirement:									
Total real memory requirement (after considering overcommitment) ¹ :									
Expanded storage estimate (Total real memory ×.25, but not more than 2 GB):									
Central storage estimate (Total real memory – expanded storage estimate):									
Number of real CPUs:									
DASD paging space (Total virtual memory × 2 or more):									

1. Total virtual memory should be no more than three times the total real memory.

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SSI Cluster Planning

- CTC connections

- DASD

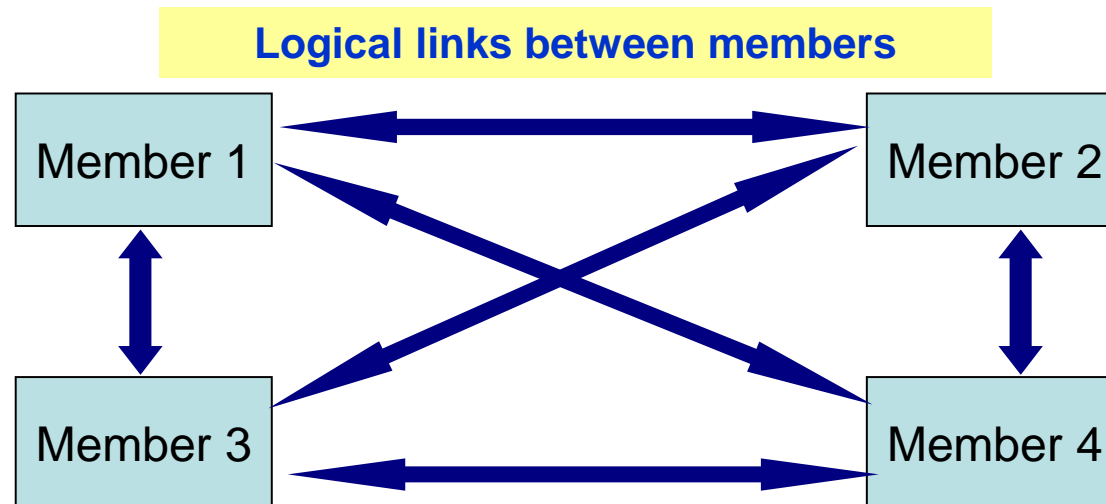
- Networks

- Cluster and member configuration

- Shared Source Directory

CTC Connections

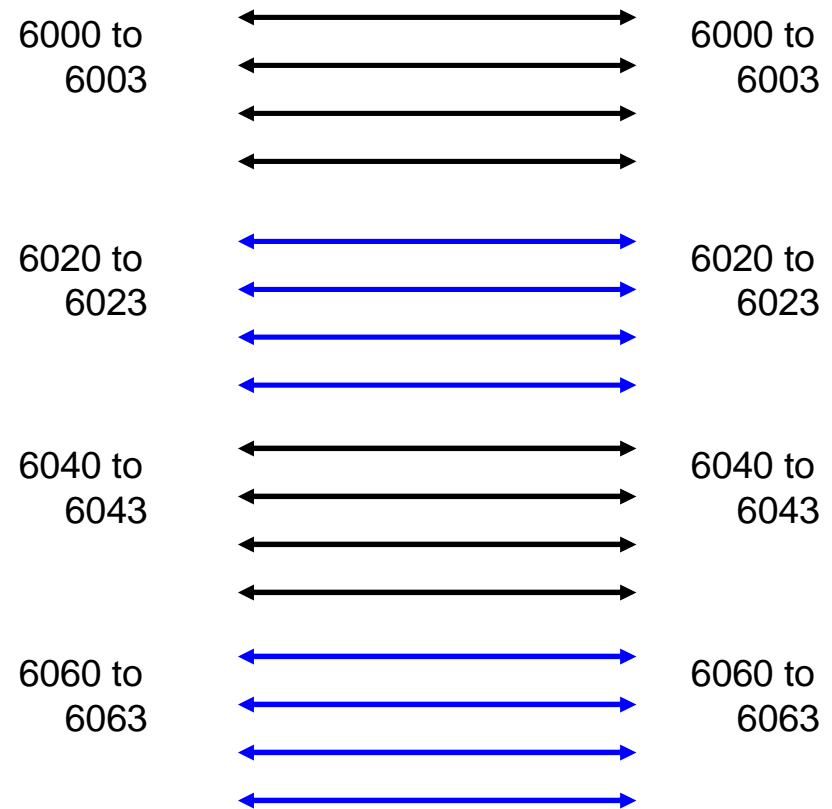
- Each member of an SSI cluster must have a direct ISFC connection to every other member (logical link)
- Logical links are composed of 1-16 CTC connections
 - FICON channel paths
 - May be switched or unswitched
- Use multiple CTCs distributed on multiple FICON channel paths between each pair of members
 - Avoids write collisions that affect link performance
 - Avoids severing logical link if one channel path is disconnected or damaged
- *Recommended practice:* Use same real device number for same CTC on each member



CTC Connections – How Many Do I Need?

- 4 CTC devices per per FICON chpid
 - provides most efficient ISFC data transfer

- For large guests, relocation and quiesce times improve with more chpids
 - Up to 4 chpid paths, with 4 CTCs each
 - *Additional factors affect relocation and quiesce times*





CTC Connections – Defining in the IOCP

```

*
CHPID PATH=(CSS(0,1),4A),PCHID=222,TYPE=FC,SHARED      SX*FC4 11/LG04/D3
CHPID PATH=(CSS(0,1),4E),PCHID=282,TYPE=FC,SHARED      SX*FC4 16/LG02/D3
*****
*** CHPID 4A SX FICON CTC                               ***
*****
*
  CNTLUNIT CUNUMBR=0C00,PATH=((CSS(0),4A)),UNIT=FCTC,      *
              UNITADD=((00,8)),CUADD=7
  IODEVICE ADDRESS=(0C00,8),CUNUMBR=(0C00),UNIT=FCTC,UNITADD=00,  *
              PART=((CSS(0),TEST7,TESTC))
*
*****
*** CHPID 4E SX FICON CTC                               ***
*****
*
  CNTLUNIT CUNUMBR=0D00,PATH=((CSS(0),4E)),UNIT=FCTC,      *
              UNITADD=((00,8)),CUADD=C
  IODEVICE ADDRESS=(0D00,8),CUNUMBR=(0D00),UNIT=FCTC,UNITADD=00,  *
              PART=((CSS(0),TEST7,TESTC))

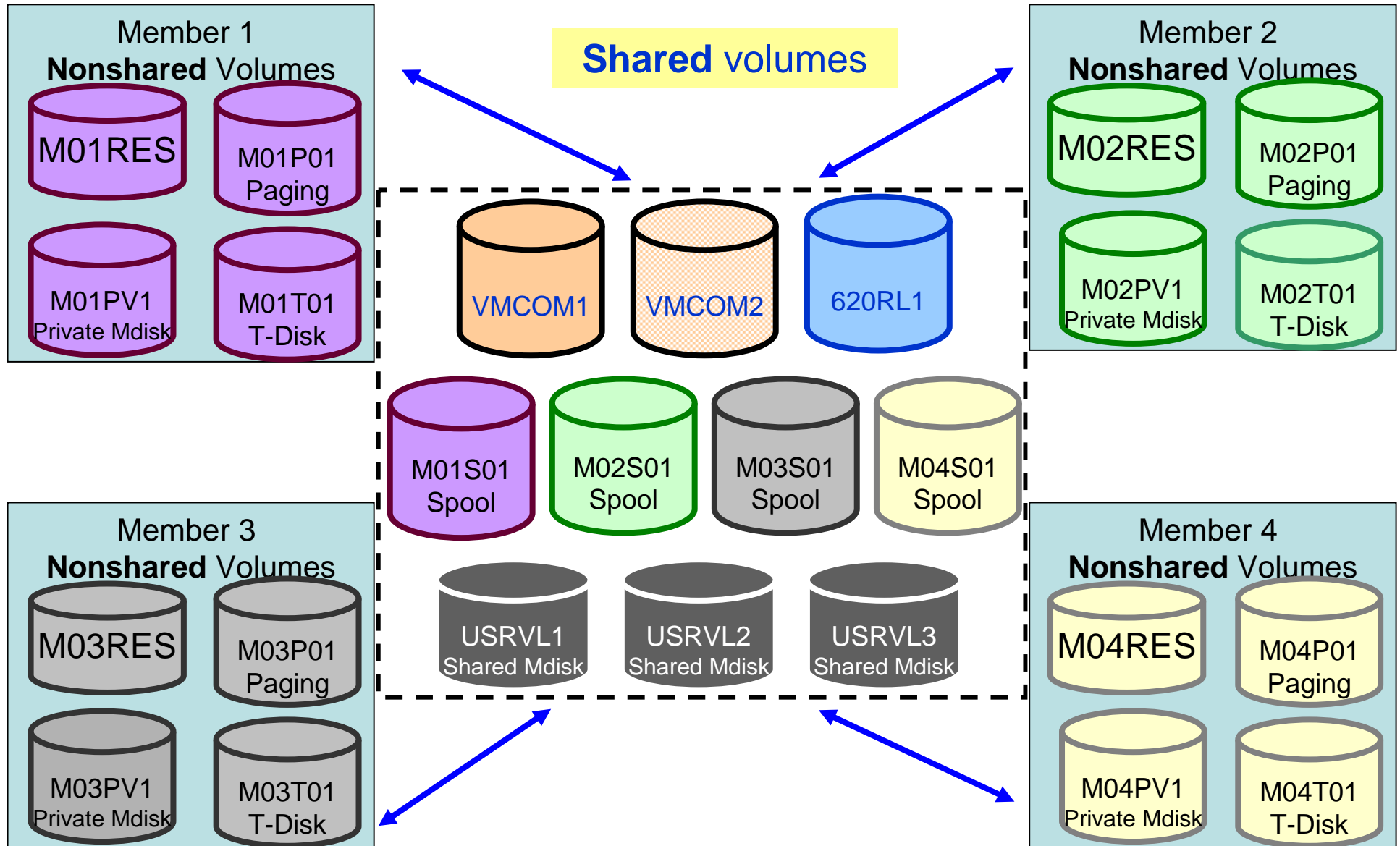
```

DASD Planning

- Determine which DASD volumes will be used for
 - Cluster-wide volume
 - Release volumes
 - System volumes
 - Shared
 - Non-shared
 - User data (minidisks)
 - Shared
 - Non-shared

- Determine which member owns each CP-Owned volume

DASD Planning – Non-Shared and Shared System Volumes





DASD Planning – CP_OWNED List

Non-SSI

```
32 /*****  
33 /*                               CP_Owned Volume Statements          */  
34 /*****  
35 /*                               SYSRES VOLUME                      */  
36 /*****  
37  
38     CP_Owned   Slot   1   M01RES  
39  
40 /*****  
41 /*                               COMMON VOLUME                      */  
42 /*****  
43  
44     CP_Owned   Slot   5   VMCOM1  
45  
46 /*****  
47 /*                               DUMP & SPOOL VOLUMES             */  
48 /*****  
49  
50     CP_Owned   Slot  10   M01S01  
51  
52 /*****  
53 /*                               PAGE & TDISK VOLUMES             */  
54 /*****  
55  
56     CP_Owned   Slot 255   M01P01
```



DASD Planning – CP_OWNED List

SSI

```

32 /*****
33 /*                               CP_Owned Volume Statements          */
34 /*****
35 /*                               SYSRES VOLUME                       */
36 /*****
37
38 MEMBER1: CP_Owned Slot 1 M01RES
39
40 /*****
41 /*                               COMMON VOLUME                       */
42 /*****
43
44 CP_Owned Slot 5 VMCOM1
45
46 /*****
47 /*                               DUMP & SPOOL VOLUMES              */
48 /*****
49
50 CP_Owned Slot 10 M01S01
51
52 /*****
53 /*                               PAGE & TDISK VOLUMES              */
54 /*****
55
56 MEMBER1: CP_Owned Slot 255 M01P01

```

DASD Planning - CP Volume Ownership

- CP-Owned volumes are marked with ownership information (CPFMTXA)
 - Cluster name
 - System name of owning member

CP-Owned areas brought online in an SSI cluster

Cluster Name on Volume	System Name on Volume	SPOL Extents (Owner or Shared)	DRCT, PAGE, and TDSK Extents and Checkpoint and Warm Start Areas (Nonshared)
None	None	No	No
None	Name of this member	Yes (owner, single-member cluster only)	Yes
None	Not the name of this member	No	No
Name of this cluster	None	No	No
Name of this cluster	Name of this member	Yes (owner)	Yes
Name of this cluster	Name of another member	Yes (shared)	No
Name of this cluster	Not the name of a member (probable configuration error)	No	No
Not the name of this cluster	Any value	No	No

- Ownership information may also be used on non-SSI systems
 - System name but no cluster name
 - Default on non-SSI installs

DASD Planning – Prepare the CP-Owned volumes

- Link the full pack overlay for each disk
- Use **CPFMTXA** to mark the volumes with ownership information

<u>Volume</u>	<u>Full pack overlay</u>	<u>Owner</u>
M01RES	MAINT 123	MYCLUSTR.MEMBER1
VMCOM1	PMAINT 141	MYCLUSTR.NOSYS
M01S01	MAINT 122	MYCLUSTR.MEMBER1
M01P01	\$PAGE\$ A01	MYCLUSTR.MEMBER1



DASD Planning – USER_VOLUME_LIST

Non-SSI

```

58 /*****/
59 /*              User_Volume_List                      */
60 /*****/
61 /* These volumes contain the minidisks for your guests, as well as */
62 /* the product disks for z/VM. Volumes that are not intended to hold */
63 /* "local" minidisks, i.e., minidisks that would be unique to a */
64 /* single system, should be kept on separate volumes.          */
65
66 /*****/
67 /* Shared User Volumes                                      */
68 /*****/
69              User_Volume_List  620RL1 620RL2 USRVL1
70
71 /*****/
72 /* User volumes for local minidisks                        */
73 /*****/
74
75              User_Volume_List  M01W01
    
```



DASD Planning – USER_VOLUME_LIST

SSI

```

58 /*****
59 /*                               User_Volume_List                               */
60 /*****
61 /* These volumes contain the minidisks for your guests, as well as          */
62 /* the product disks for z/VM. Volumes that are not intended to hold       */
63 /* "local" minidisks, i.e., minidisks that would be unique to a           */
64 /* single system, should be kept on separate volumes.                       */
65
66 /*****
67 /* Shared User Volumes                                                       */
68 /*****
69                               User_Volume_List  620RL1 620RL2 USRVL1
70
71 /*****
72 /* User volumes for local minidisks                                         */
73 /*****
74
75 MEMBER1:      User_Volume_List  M01W01 M01PV1

```

Networks in an SSI

- All members should have identical network connectivity
 - Connected to same physical LAN segments
 - Connected to same SAN fabric

- Assign equivalence identifiers (EQIDs) to all network devices
 - Devices assigned same EQID on each member must be
 - same type
 - have the same capabilities
 - have connectivity to the same destinations

- Updates to the main TCPIP stack configuration
 - *PROFILE TCPIP* now can have member-specific names like *MEMBER1 TCPIP* and *MEMBER2 TCPIP*
 - *TCPIP DATA* file can be shared among SSI members, so you can add system qualifiers to statements like **HOSTNAME**

Networks in an SSI – Virtual Switches

- Define virtual switches with same name on each member
- For relocating guests:
 - Source and destination virtual switch guest NIC and port configurations must be equivalent
 - Port type
 - Authorizations (access, VLAN, promiscuous mode)
 - Source and destination virtual switches must be equivalent
 - Name and type
 - VLAN settings
 - Operational UPLINK port with matching EQID
 - Device and port numbers need not match, but connectivity to the same LAN segment is required

Networks in an SSI – MAC Addresses

- MAC address assignments are coordinated across an SSI cluster
 - VMLAN statement
 - MACPREFIX must be set to different value for each member
 - Default is 02-xx-xx where xx-xx is "system number" of member (e.g., 02-00-01 for member 1)
 - USERPREFIX must be set for SSI members
 - Must be identical for all members
 - Must not be equal to any member's MACPREFIX value
 - Default is 02-00-00
 - MACIDRANGE is ignored in an SSI cluster
 - Because MAC assignment is coordinated among members

– Example:

```
VMSYS01: VMLAN MACPREFIX 021111 USERPREFIX 02AAAA
VMSYS02: VMLAN MACPREFIX 022222 USERPREFIX 02AAAA
VMSYS03: VMLAN MACPREFIX 023333 USERPREFIX 02AAAA
VMSYS04: VMLAN MACPREFIX 024444 USERPREFIX 02AAAA
```



Cluster and Member Configuration – SYSTEM_IDENTIFIER Statement

Non-SSI

```

1  /*****
2  /*          SYSTEM CONFIG FILE          */
3  /*****
4  /*          */
5  /*  Refer to CP Planning and Administration for SYSTEM CONFIG rules  */
6  /*          */
7  /*  Warning - Always run CPSYNTAX after updating the SYSTEM CONFIG  */
8  /*          */
9  /*****
10
11 /*****
12 /*          System_Identifier Information          */
13 /*****
14
15 System_Identifier * * MEMBER1
    
```

Cluster and Member Configuration – SYSTEM_IDENTIFIER Statement

SSI

```

1  /*****
2  /*          SYSTEM CONFIG FILE
3  /*****
4  /*
5  /*  Refer to CP Planning and Administration for SYSTEM CONFIG rules
6  /*
7  /*  Warning - Always run CPSYNTAX after updating the SYSTEM CONFIG
8  /*
9  /*****
10
11 /*****
12 /*          System_Identifier Information
13 /*****
14
15 System_Identifier LPAR LP01 MEMBER1
    
```



Cluster and Member Configuration – SSI Statement

```
17 /*****  
18 /*          SSI Statement          */  
19 /*****  
20  
21 SSI MYCLUSTR PDR_Volume VMCOM1 ,  
22 Slot 1 MEMBER1  
23
```

Cluster and Member Configuration – SYSTEM_RESIDENCE Statement

Non-SSI

```

24 /*****
25 /*          Checkpoint and Warmstart Information          */
26 /*****
27
28 System_Residence,
29     Checkpoint  Valid M01RES      From CYL 21  For 9  ,
30     Warmstart   Valid M01RES      From CYL 30  For 9
31

```

SSI

```

24 /*****
25 /*          Checkpoint and Warmstart Information          */
26 /*****
27
28 MEMBER1: System_Residence,
29     Checkpoint  Valid M01RES      From CYL 21  For 9  ,
30     Warmstart   Valid M01RES      From CYL 30  For 9
31

```

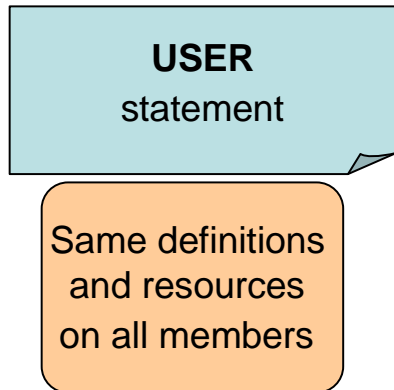
Cluster and Member Configuration – Additional Steps

- Enable the SSI feature
- If you're migrating from non-SSI to SSI, you'll want to enable the **PROMPT_AFTER_SHUTDOWN_REIPL** feature before you relPL, so you can do a cold start
- Run CPSYNTAX

```
cpsyntax sysnew config (system member1  
CONFIGURATION FILE PROCESSING COMPLETE -- NO ERRORS ENCOUNTERED.  
Ready; T=0.25/0.26 11:43:57
```

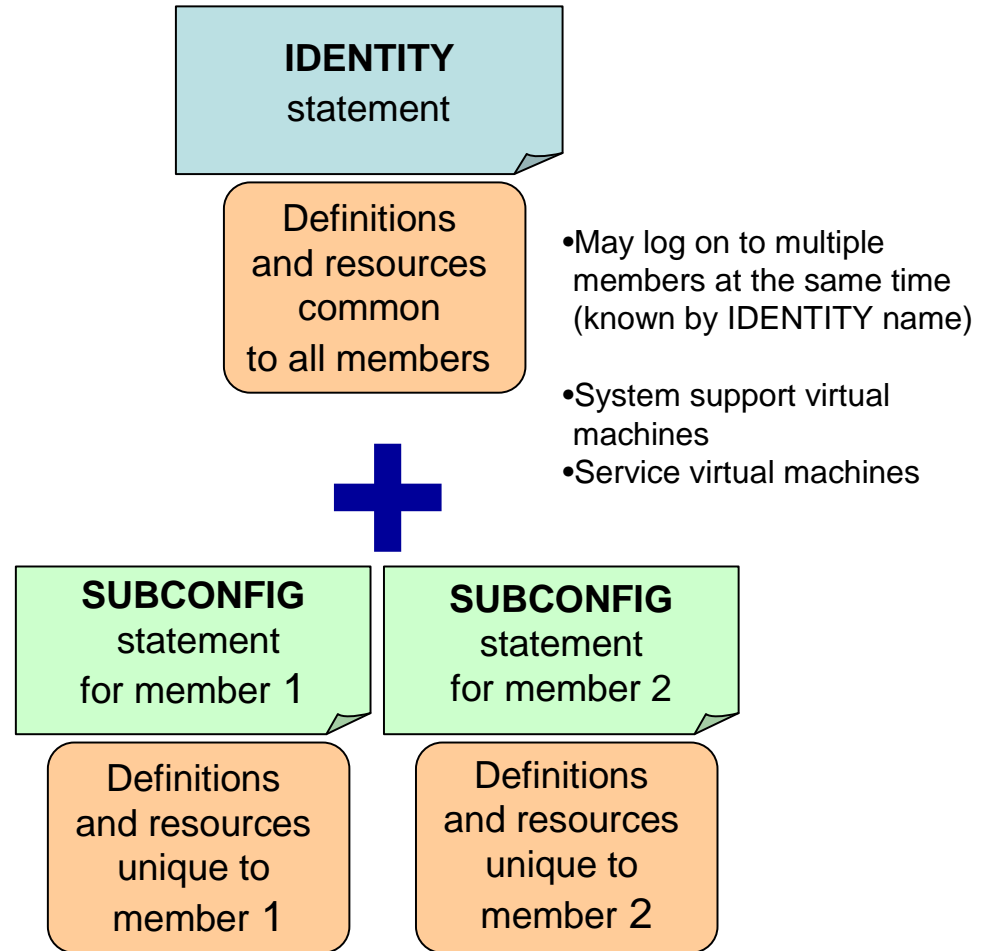
Shared Source Directory – Virtual Machine Definition Types

Single Configuration Virtual Machine (traditional)



- May log on to any member
 - Only one member at a time
- General Workload
 - Guest Operating Systems
 - Service virtual machines requiring only one logon in the cluster

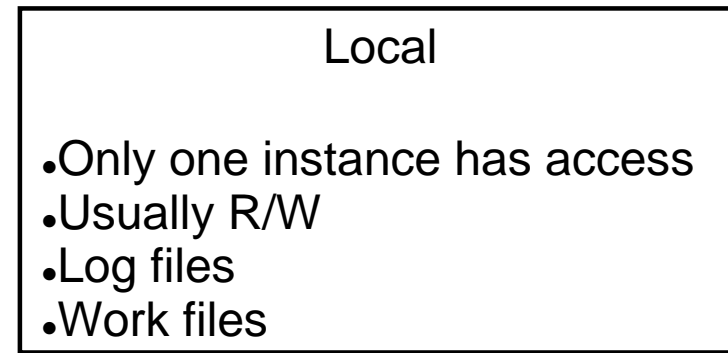
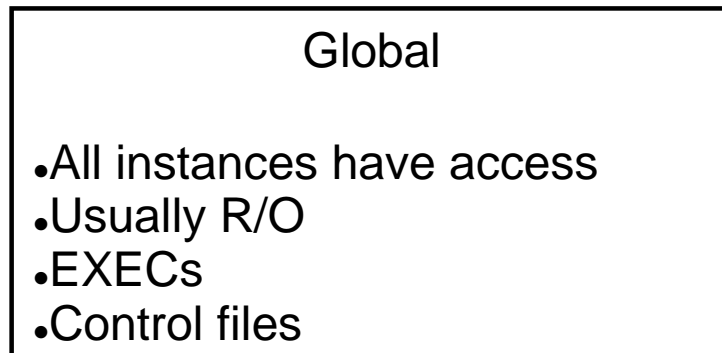
Multiconfiguration Virtual Machine (new)



- May log on to multiple members at the same time (known by IDENTITY name)
- System support virtual machines
- Service virtual machines

Shared Source Directory – Global and Local disks

- For each guest you're turning into a multiconfiguration virtual machine, decide which disks should be global and which should be local
 - You may want to split existing disks into global and local.



Shared Source Directory - New Layout

- IBM-supplied directory will be significantly different than in previous releases
 - Both SSI and non-SSI installations
 - Directory for non-SSI installations will be in "SSI-ready" format
 - Facilitate future SSI deployment

- Many of the IBM-supplied userids will be defined as multiconfiguration virtual machines

- Determine if any of your guests should be defined as multiconfiguration virtual machines
 - Most will be single-configuration virtual machines
 - Userids defined on SYSTEM_USERIDS statements will usually be multiconfiguration virtual machines

- Merge your user definitions into the IBM-supplied directory



Shared Source Directory - Multiconfiguration Virtual Machine Definition

```
IDENTITY MAINT      MAINTPAS      128M 1000M ABCDEFG
```

```
BUILD ON SSIMEMB1 USING SUBCONFIG MAINT-1
BUILD ON SSIMEMB2 USING SUBCONFIG MAINT-2
BUILD ON SSIMEMB3 USING SUBCONFIG MAINT-3
BUILD ON SSIMEMB4 USING SUBCONFIG MAINT-4
```

```
CONSOLE 009 3215 T
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A
LINK USER1 2CC 2CC RR
LINK USER1 551 551 RR
```

These statements apply to all instances of MAINT on all members

```
SUBCONFIG MAINT-1
MDISK 0191 3390 1000 20 MNTVL1 WR
MDISK CF1 3390 100 20 M01RES RR
* END OF MAINT-1
```

These statements only apply to MAINT on member SSIMEMB1

```
SUBCONFIG MAINT-2
MDISK 0191 3390 1000 20 MNTVL2 WR
MDISK CF1 3390 100 20 M02RES RR
* END OF MAINT-2
```

These statements only apply to MAINT on member SSIMEMB2

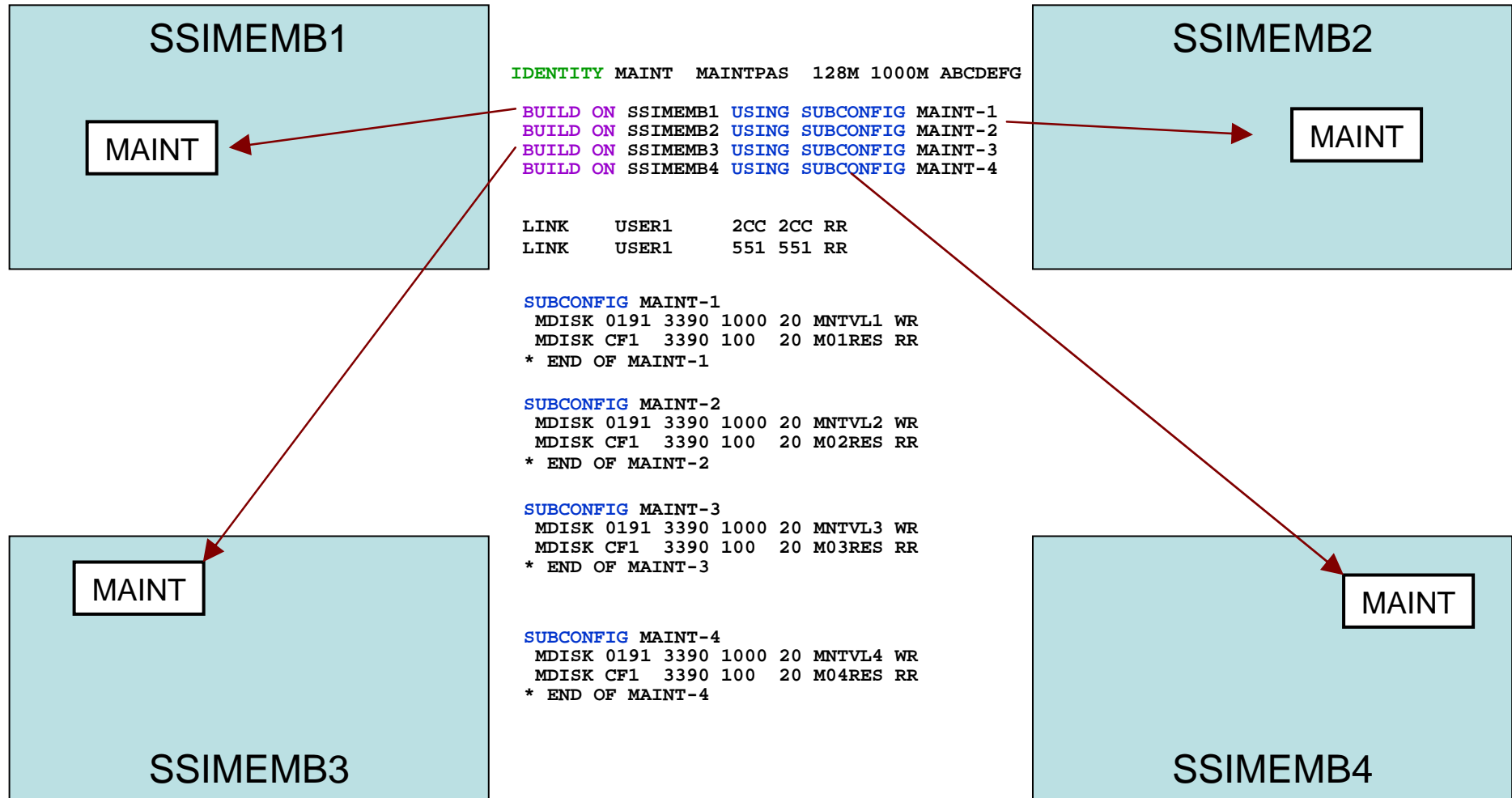
```
SUBCONFIG MAINT-3
MDISK 0191 3390 1000 20 MNTVL3 WR
MDISK CF1 3390 100 20 M03RES RR
* END OF MAINT-3
```

These statements only apply to MAINT on member SSIMEMB3

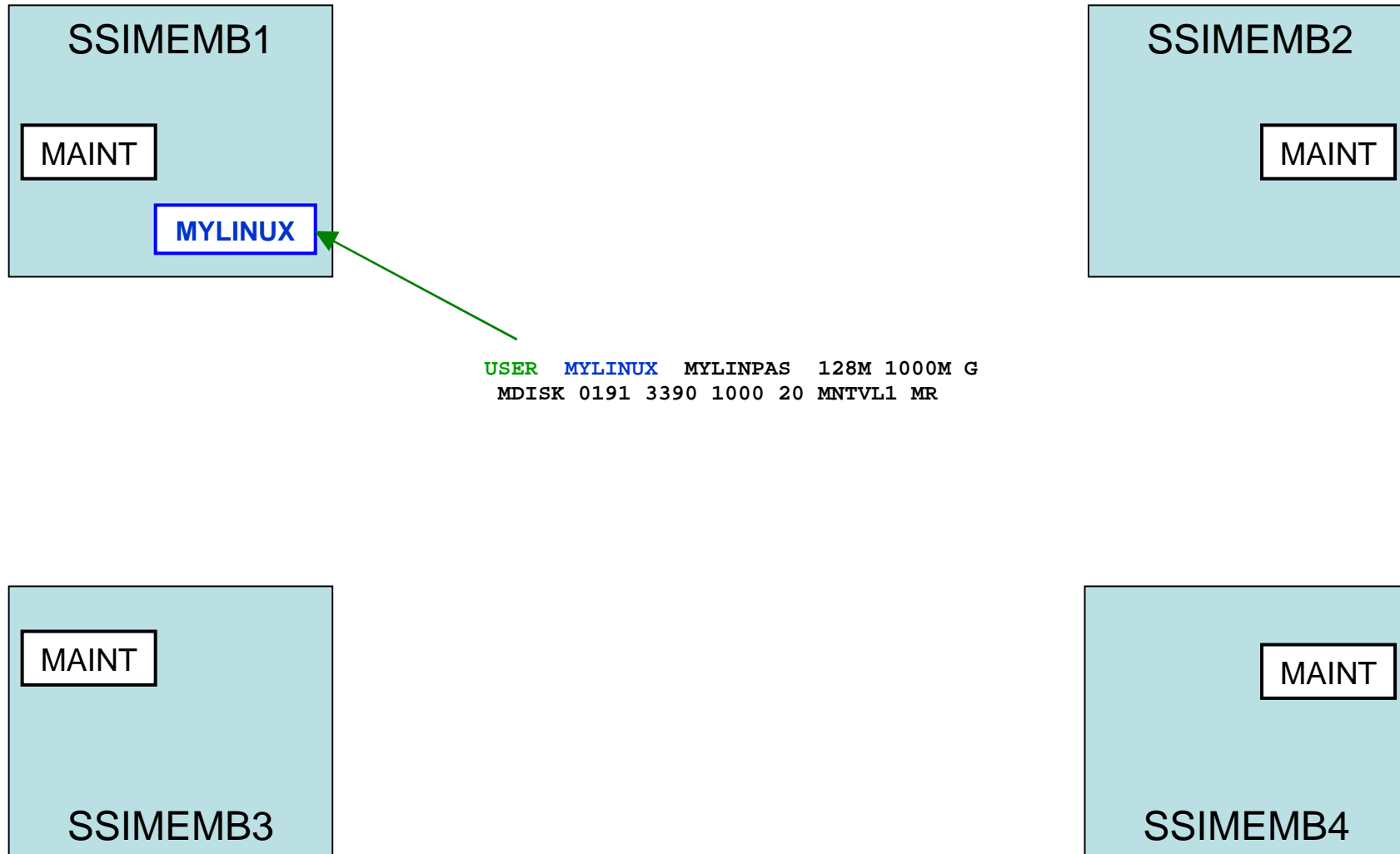
```
SUBCONFIG MAINT-4
MDISK 0191 3390 1000 20 MNTVL4 WR
MDISK CF1 3390 100 20 M04RES RR
* END OF MAINT-4
```

These statements only apply to MAINT on member SSIMEMB4

Shared Source Directory – Multiconfiguration Virtual Machines



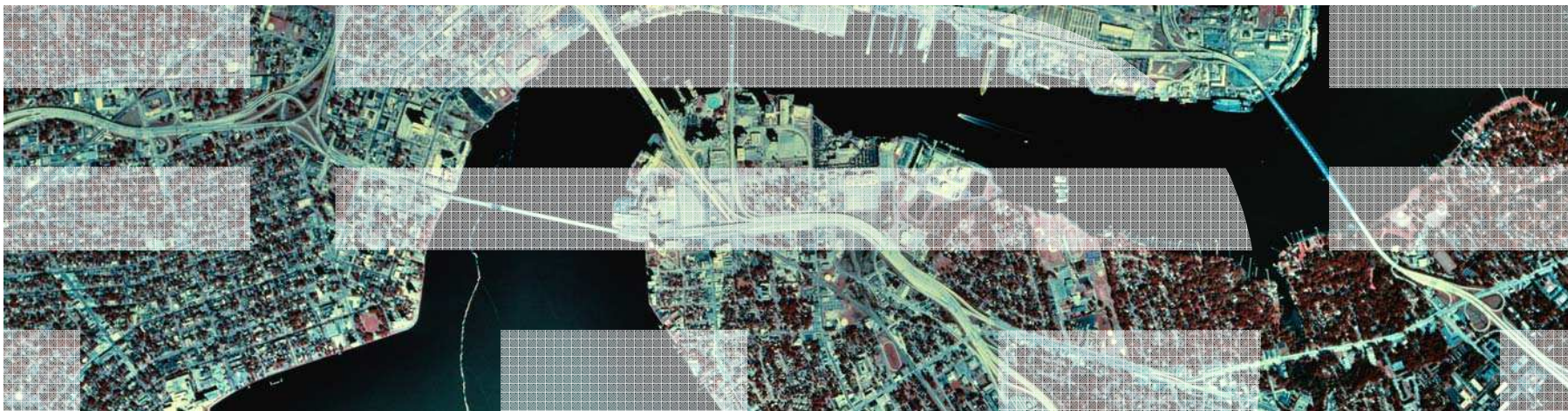
Shared Source Directory – Single Configuration Virtual Machines





Shared Source Directory – DISKMAP

17	VOLUME	USERID	CUU	DEVTYPE	START	END	SIZE	SUBCONFIG	MEMBER
18	M01RES	\$ALLOC\$	A04	3390	00000	00000	00001		*
19		\$DIRECT\$	A01	3390	00001	00020	00020		*
20		\$SYSCKP\$	A01	3390	00021	00029	00009		*
21		\$SYSWRM\$	A01	3390	00030	00038	00009		*
22		MAINT	CF1	3390	00039	00158	00120	MAINT-1	*
23		MAINT	CFD	3390	00159	00159	00001	MAINT-1	*
24		MAINT	CF3	3390	00160	00279	00120	MAINT-1	*
25		MAINT	190	3390	00280	00493	00214	MAINT-1	*
26		MAINT	191	3390	00494	00668	00175	MAINT-1	*
27		MAINT	193	3390	00669	01168	00500	MAINT-1	*
28		MAINT	19D	3390	01169	01460	00292	MAINT-1	*
29		MAINT	19E	3390	01461	01960	00500	MAINT-1	*
30		MAINT	401	3390	01961	02252	00292	MAINT-1	*
31		MAINT	402	3390	02253	02544	00292	MAINT-1	*
32		MAINT	990	3390	02545	02604	00060	MAINT-1	*



Migrating to SSI

Use Case Scenarios

- Migration procedures for existing z/VM environments
 - Documented in CP Planning and Administration
 - Converting a z/VM System to a Single-Member z/VM SSI Cluster
 - Adding a Member to a z/VM SSI Cluster by Cloning an Existing Member
 - Combining Two Non-SSI z/VM Systems to Create a z/VM SSI Cluster
 - Moving a Second-Level z/VM SSI Cluster to First-Level
 - Converting a CSE Complex to a z/VM SSI Cluster
 - Decommissioning a Member of a z/VM SSI Cluster

- Review documented procedures before deciding whether to do SSI or non-SSI install

Migrating from a Non-SSI 6.2.0 system to a Single Member SSI

1. Prepare the New DASD Volumes
2. Update the System Configuration File
3. Update the User Directory
4. Manage the User Spool Files
5. Prepare the CP-Owned Volumes
6. Create the PDR
7. Modify the Startup Parameters for the VMPSFS File Pool
8. Shut Down and Cold Start
9. Load the Spool Files
10. Change the User Directory to SSI-Enabled



"SSI-enable" the Shared Source Directory

Non-SSI

```
1 *****
2 *   z/VM 6.2.0   SYSTEM DIRECTORY                               *
3 *****
4 *
5 *   THE ADDRESSES 123 THROUGH 133 ARE VIRTUAL ADDRESSES.      *
6 *
7 *   NOTES:
8 *   REMEMBER THESE ARE ONLY VIRTUAL ADDRESSES NOT REAL      *
9 *   ADDRESSES, SO THERE IS NO NEED TO CHANGE THEM TO MATCH  *
10 *   YOUR HARDWARE ADDRESSES.
11 *
12 *
13 *****
14 *
15 *   FOR A DESCRIPTION OF DIRECTORY STATEMENTS SEE:
16 *       VM ENTERPRISE SYSTEM ARCHITECTURE
17 *       PLANNING AND ADMINISTRATION MANUAL.
18 *
19 *****
20 *
21 *
22 *
23 DIRECTORY 123 3390 M01RES
```



"SSI-enable" the Shared Source Directory

SSI

```
1 *****
2 *   z/VM 6.2.0  SYSTEM DIRECTORY                               *
3 *****
4 *
5 *   THE ADDRESSES 123 THROUGH 133 ARE VIRTUAL ADDRESSES.      *
6 *
7 *   NOTES:
8 *   REMEMBER THESE ARE ONLY VIRTUAL ADDRESSES NOT REAL      *
9 *   ADDRESSES, SO THERE IS NO NEED TO CHANGE THEM TO MATCH  *
10 *   YOUR HARDWARE ADDRESSES.
11 *
12 *
13 *****
14 *
15 *   FOR A DESCRIPTION OF DIRECTORY STATEMENTS SEE:
16 *       VM ENTERPRISE SYSTEM ARCHITECTURE
17 *       PLANNING AND ADMINISTRATION MANUAL.
18 *
19 *****
20 *
21 *
22 *
23 DIRECTORY SSI 123 3390 M01RES M02RES M03RES M04RES
```

"SSI-enable" the Shared Source Directory

- Update the **BUILD** statements with the actual member name
 - Multiconfiguration virtual machines will have asterisks instead of machine names
- Run **DIRECTXA** to put the new directory into production

Non-SSI

```
165 IDENTITY MAINT MAINT 128M 1000M ABCDEFG  
166 BUILD ON * USING SUBCONFIG MAINT-1
```

SSI

```
165 IDENTITY MAINT MAINT 128M 1000M ABCDEFG  
166 BUILD ON MEMBER1 USING SUBCONFIG MAINT-1
```

Create the Persistent Data Record (PDR)

- **LINK** the fullpack overlay of *VMCOM1*, **PMAINT 141**

```

formssi create 141 myclustr
HCPPDF6613R Device 0141 label is VMCOM1 - continue (Yes/No)?
yes
HCPPDF6614I Persistent Data Record created on device 0141
Ready; T=0.01/0.01 14:35:48

formssi display 141
HCPPDF6618I Persistent Data Record on device 0141 (label VMCOM1) is for MYCLUSTR
HCPPDF6619I PDR                      state: Unlocked
HCPPDF6619I                          time stamp: 09/23/11 14:35:48
HCPPDF6619I                          cross-system timeouts: Enabled
Ready; T=0.01/0.01 14:35:54
    
```

Changes to the VMPSYS file pool

- In the *VMSERVP DMSPARMS* file the **LOCAL** startup parameter has changed to **SSI**:

Non-SSI

```
00001 ADMIN MAINT MAINT620
AUTOLOG1
00002 NOBACKUP
00003 SAVESEGID CMSFILES
00004 LOCAL
00005 FILEPOOLID SERVPPOOL
00006 USERS 100
```

SSI

```
00001 ADMIN MAINT MAINT620
AUTOLOG1
00002 NOBACKUP
00003 SAVESEGID CMSFILES
00004 SSI
00005 FILEPOOLID SERVPPOOL
00006 USERS 100
```

IPL the Single (First) Member of your SSI Cluster

```

20:12:47 HCPAAU2700I System gateway MEMBER1 identified.
20:12:47 HCPNET3010I Virtual machine network device configuration changes are permitted
20:12:47 HCPPLM1697I The state of SSI system MEMBER1 has changed from DOWN to JOINED
20:12:47 HCPPLM1698I The mode of the SSI cluster is STABLE
    
```

```

q ssi
16:57:39 SSI Name: MYCLUSTR
16:57:39 SSI Mode: Stable
16:57:39 Cross-System Timeouts: Enabled
16:57:39 SSI Persistent Data Record (PDR) device: VMCOM1 on E00A
16:57:39 SLOT SYSTEMID STATE          PDR HEARTBEAT          RECEIVED HEARTBEAT
16:57:39     1 MEMBER1  Joined          2011-10-13 16:57:17 2011-10-13 16:57:17
16:57:39     2 ----- Available
16:57:39     3 ----- Available
16:57:39     4 ----- Available
Ready; T=0.01/0.01 16:57:39
    
```

Adding a Second Member to Create a Two-member Cluster

1. Format the new member's volumes
2. Create the new member's services' configurations
3. Copy the member-specific volumes
4. Update the user directory
5. Update the shared system configuration
6. Enable the existing member to access the new member
7. IPL the new member
8. Update the Product Inventory Table
9. Build the saved segments
10. **XAUTOLOG AUTOLOG1** and check MEMBER2

Enable Existing Members to Accept the New Member

```

set ssi slot 2 member2
Ready; T=0.01/0.01 16:57:51
q ssi
16:57:53 SSI Name: MYCLUSTR
16:57:53 SSI Mode: Stable
16:57:53 Cross-System Timeouts: Enabled
16:57:53 SSI Persistent Data Record (PDR) device: VMCOM1 on E00A
16:57:53 SLOT SYSTEMID STATE          PDR HEARTBEAT          RECEIVED HEARTBEAT
16:57:53     1 MEMBER1  Joined          2011-10-13 16:57:47 2011-10-13 16:57:47
16:57:53     2 MEMBER2  Down (not IPLed)
16:57:53     3 ----- Available
16:57:53     4 ----- Available
Ready; T=0.01/0.01 16:57:53

```

```

activate islink 50 60 70
16:58:26 Link device 0050 activated.
16:58:26 Link device 0060 activated.
16:58:26 Link device 0070 activated.
Ready; T=0.01/0.01 16:58:26

```


Summary

- SSI is a new way to deploy z/VM images and resources
 - Benefit from clustering and virtual server mobility

- Planning and thought required
 - Capacity and equipment
 - Resource sharing
 - Virtual networks
 - Installation
 - SSI cluster configuration
 - Migrating from your current z/VM environment
 - User directory
 - Virtual machine (guest) definition and distribution
 - Live Guest Relocation

- New documentation to assist with
 - SSI Planning
 - Migrating to an SSI cluster

z/VM 6.2.0 information and documentation:
<http://www.vm.ibm.com/zvm620/>

Thanks!

Contact Information:

John Franciscovich
IBM
z/VM Development
Endicott, NY

francisj@us.ibm.com